SEQUENCE LISTING

<110> NILES, ANDREW L
MAFFITT, MARK A
HAAK-FRENDSCHO, MARY

<120> RECOMBINANT PROTEOLYTIC TYPTASES, ACTIVE SITE MUTANTS THEREOF, AND METHODS OF MAKING SAME

<130> CIP TRYPTASE

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<150> 09/079,970
<151> 1998-04-15

<160> 51

<170> PatentIn Ver. 2.0

<210> 1
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 1

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Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
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agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
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Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                85                  90                  95

ctg gag gag ccg gtg aac gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
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<210> 2
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<212> PRT
<213> Homo sapiens

<400> 2

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Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
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Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220
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Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
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Val Pro Lys Lys Pro
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:PCR Primer

<400> 3
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<210> 4
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:PCR Primer

<400> 4
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<210> 5
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

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1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

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cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
            50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
        65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
    80                  85                  90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aac gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His
95                  100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220
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gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
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<210> 6
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<212> PRT
<213> Homo sapiens

<400> 6

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Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
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Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175
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```
Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
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<210> 7
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Mutagenesis
Oligo

<400> 7
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<210> 8
<211> 771
<212> DNA
<213> Homo sapiens

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<222> (7)..(753)

<400> 8
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aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg   96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
 15                  20                  25                  30
```

```
cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
            50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
        65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
    80                  85                  90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aag gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His
95                  100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220
```

```
gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
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<210> 9
<211> 249
<212> PRT
<213> Homo sapiens

<400> 9

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Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
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Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175
```

```
Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
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<210> 10
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<213> Homo sapiens

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<222> (1)..(735)

<400> 10

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Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
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```
                85                  90                  95

ctg gag gag ccg gtg aag gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
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<210> 11
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<212> PRT
<213> Homo sapiens

<400> 11

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Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
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Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
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<210> 12
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutagenesis
Oligo

<400> 12
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<210> 13
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutagenesis
Oligo

<400> 13
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<210> 14
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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Oligo

<400> 14
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<210> 15
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
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Oligo

<400> 15
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<210> 16
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<212> DNA
<213> Artificial Sequence

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Oligo

<400> 16
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<210> 17
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutagenesis
Oligo

<400> 17
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<210> 18
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Mutagenesis
Oligo

<400> 18
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<210> 19
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<223> Description of Artificial Sequence:Mutagenesis
Oligo

<400> 19
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<210> 20
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<212> DNA
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<221> CDS
<222> (7)..(753)

<400> 20
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Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gcc 144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
35 40 45

gcg gcg tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg 192
Ala Ala Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
50 55 60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc 240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
65 70 75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg 288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
80 85 90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aag gtc tcc agc cac 336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His
95 100 105 110

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gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
```

<210> 21
<211> 249
<212> PRT
<213> Homo sapiens

<400> 21

```
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30
```

```
Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
```

<210> 22
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 22
gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc 48
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca 144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
35 40 45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg 192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
50 55 60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc 240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
65 70 75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg 288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
80 85 90

gca atc gcc ctg ctg gag ctg gag gag ccg gtg aag gtc tcc agc cac 336
Ala Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His
95 100 105 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg 384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
115 120 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc 432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
130 135 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa 480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
145 150 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac 528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp

```
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
```

<210> 23
<211> 249
<212> PRT
<213> Homo sapiens

<400> 23

```
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His Val His
```

100 105 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
115 120 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
130 135 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145 150 155 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
165 170 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
180 185 190

Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
195 200 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
210 215 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225 230 235 240

Ile His His Tyr Val Pro Lys Lys Pro
245

<210> 24
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 24
gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc 48
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

```
cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
            50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
        65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
    80                  85                  90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aag gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His
95                  100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgt caa ggc gac gcc ggc gga cct ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220
```

```
gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
```

<210> 25
<211> 249
<212> PRT
<213> Homo sapiens

<400> 25

```
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175
```

```
Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
```

<210> 26
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 26

```
gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc    48
       Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
         1               5                  10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg   96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
 15                  20                  25                  30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
            50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
        65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
```

```
     80                  85                  90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aag gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His
 95                 100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc caa gga gac gcc ggc gga cca ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
```

<210> 27
<211> 249
<212> PRT
<213> Homo sapiens

<400> 27

```
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Lys Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
```

<210> 28
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 28

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atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg   48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gcc gcg gcg tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

ctg gag gag ccg gtg aag gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140
```

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca 480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145 150 155 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt 528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
165 170 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc 576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
180 185 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag 624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
195 200 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct 672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
210 215 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat 720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225 230 235 240

gtc ccc aaa aag ccg 735
Val Pro Lys Lys Pro
245

<210> 29
<211> 245
<212> PRT
<213> Homo sapiens

<400> 29
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
1 5 10 15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
20 25 30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala Cys Val Gly Pro
35 40 45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
50 55 60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His

```
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
```

<210> 30
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 30
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg 48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val

```
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
            20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
        35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
    50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gca atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile Ala Leu Leu Glu
                85                  90                  95

ctg gag gag ccg gtg aag gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
```

```
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 31
<211> 245
<212> PRT
<213> Homo sapiens

<400> 31

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140
```

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145 150 155 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
165 170 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
180 185 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
195 200 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
210 215 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225 230 235 240

Val Pro Lys Lys Pro
245

<210> 32
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 32
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg 48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
1 5 10 15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc 96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
20 25 30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg 144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
35 40 45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac 192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
50 55 60

```
ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                85                  90                  95

ctg gag gag ccg gtg aag gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgt caa ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac gcc ggc gga cct ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 33
<211> 245
<212> PRT
<213> Homo sapiens

<400> 33

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Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220
```

```
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
```

<210> 34
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 34

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atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg   48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

ctg gag gag ccg gtg aag gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
```

```
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc caa gga   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac gcc ggc gga cca ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
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<210> 35
<211> 245
<212> PRT
<213> Homo sapiens

<400> 35

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
```

```
          35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Lys Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
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<210> 36
<211> 771
<212> DNA
<213> Homo sapiens

<220>

<221> CDS
<222> (7)..(753)

<400> 36

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gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc    48
       Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
         1               5                  10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg    96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
 15                  20                  25                  30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gcc   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                 35                  40                  45

gcg gcg tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala Ala Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
             50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
         65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
     80                  85                  90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aac gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His
 95                 100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170
```

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg 576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175 180 185 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg 624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
195 200 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt 672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
210 215 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg 720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
225 230 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt 771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
240 245

<210> 37
<211> 249
<212> PRT
<213> Homo sapiens

<400> 37
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
1 5 10 15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
20 25 30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala
35 40 45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
50 55 60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
65 70 75 80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
85 90 95

Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His Val His
100 105 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
115 120 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
130 135 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145 150 155 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
165 170 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
180 185 190

Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
195 200 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
210 215 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225 230 235 240

Ile His His Tyr Val Pro Lys Lys Pro
245

<210> 38
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 38
gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc 48
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca 144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala

```
                    35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
             50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
         65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
     80                  85                  90

gca atc gcc ctg ctg gag ctg gag gag ccg gtg aac gtc tcc agc cac   336
Ala Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His
 95                 100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc cag ggc gac tcc gga ggg ccc ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
```

```
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245


<210> 39
<211> 249
<212> PRT
<213> Homo sapiens

<400> 39
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190
```

```
Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
```

<210> 40
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 40

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gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc    48
       Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
         1               5                  10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg   96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
 15                  20                  25                  30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca   144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
                35                  40                  45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg   192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
            50                  55                  60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc   240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
        65                  70                  75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg   288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
    80                  85                  90
```

```
gac atc gcc ctg ctg gag ctg gag gag ccg gtg aac gtc tcc agc cac   336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His
 95                  100                 105                 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg   384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
                115                 120                 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc   432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
            130                 135                 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa   480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgt caa ggc gac gcc ggc gga cct ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
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<210> 41
<211> 249
<212> PRT
<213> Homo sapiens

<400> 41

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Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
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  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
            20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
        35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
    50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
65                  70                  75                  80

Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
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<210> 42
<211> 771
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (7)..(753)

<400> 42
gggccc ctc gag aaa aga atc gtc ggg ggt cag gag gcc ccc agg agc 48
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser
1 5 10

aag tgg ccc tgg cag gtg agc ctg aga gtc cac ggc cca tac tgg atg 96
Lys Trp Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met
15 20 25 30

cac ttc tgc ggg ggc tcc ctc atc cac ccc cag tgg gtg ctg acc gca 144
His Phe Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala
35 40 45

gcg cac tgc gtg gga ccg gac gtc aag gat ctg gcc gcc ctc agg gtg 192
Ala His Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val
50 55 60

caa ctg cgg gag cag cac ctc tac tac cag gac cag ctg ctg ccg gtc 240
Gln Leu Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val
65 70 75

agc agg atc atc gtg cac cca cag ttc tac acc gcc cag atc gga gcg 288
Ser Arg Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala
80 85 90

gac atc gcc ctg ctg gag ctg gag gag ccg gtg aac gtc tcc agc cac 336
Asp Ile Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His
95 100 105 110

gtc cac acg gtc acc ctg ccc cct gcc tca gag acc ttc ccc ccg ggg 384
Val His Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly
115 120 125

atg ccg tgc tgg gtc act ggc tgg ggc gat gtg gac aat gat gag cgc 432
Met Pro Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg
130 135 140

ctc cca ccg cca ttt cct ctg aag cag gtg aag gtc ccc ata atg gaa 480
Leu Pro Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu

```
        145                 150                 155

aac cac att tgt gac gca aaa tac cac ctt ggc gcc tac acg gga gac   528
Asn His Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp
    160                 165                 170

gac gtc cgc atc gtc cgt gac gac atg ctg tgt gcc ggg aac acc cgg   576
Asp Val Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg
175                 180                 185                 190

agg gac tca tgc caa gga gac gcc ggc gga cca ctg gtg tgc aag gtg   624
Arg Asp Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val
                195                 200                 205

aat ggc acc tgg ctg cag gcg ggc gtg gtc agc tgg ggc gag ggc tgt   672
Asn Gly Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys
            210                 215                 220

gcc cag ccc aac cgg cct ggc atc tac acc cgt gtc acc tac tac ttg   720
Ala Gln Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu
        225                 230                 235

gac tgg atc cac cac tat gtc ccc aaa aag ccg tgaagcggcc gccgtcgt   771
Asp Trp Ile His His Tyr Val Pro Lys Lys Pro
    240                 245
```

<210> 43
<211> 249
<212> PRT
<213> Homo sapiens

<400> 43

```
Leu Glu Lys Arg Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp
  1               5                  10                  15

Pro Trp Gln Val Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe
             20                  25                  30

Cys Gly Gly Ser Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His
         35                  40                  45

Cys Val Gly Pro Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu
     50                  55                  60

Arg Glu Gln His Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg
 65                  70                  75                  80
```

```
Ile Ile Val His Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile
                 85                  90                  95

Ala Leu Leu Glu Leu Glu Glu Pro Val Asn Val Ser Ser His Val His
            100                 105                 110

Thr Val Thr Leu Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro
        115                 120                 125

Cys Trp Val Thr Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro
    130                 135                 140

Pro Pro Phe Pro Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His
145                 150                 155                 160

Ile Cys Asp Ala Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val
                165                 170                 175

Arg Ile Val Arg Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp
            180                 185                 190

Ser Cys Gln Gly Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly
        195                 200                 205

Thr Trp Leu Gln Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln
    210                 215                 220

Pro Asn Arg Pro Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp
225                 230                 235                 240

Ile His His Tyr Val Pro Lys Lys Pro
                245
```

<210> 44
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 44
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg 48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1   5   10   15

```
agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gcc gcg gcg tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

ctg gag gag ccg gtg aac gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205
```

```
gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 45
<211> 245
<212> PRT
<213> Homo sapiens

<400> 45

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala Ala Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160
```

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
165 170 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
180 185 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
195 200 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
210 215 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225 230 235 240

Val Pro Lys Lys Pro
245

<210> 46
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 46
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg 48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
1 5 10 15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc 96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
20 25 30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg 144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
35 40 45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac 192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
50 55 60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac 240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His

```
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gca atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile Ala Leu Leu Glu
                85                  90                  95

ctg gag gag ccg gtg aac gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc cag ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac tcc gga ggg ccc ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 47

<211> 245
<212> PRT
<213> Homo sapiens

<400> 47

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Ala Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ser Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
```

```
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
```

<210> 48
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 48

```
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg   48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

ctg gag gag ccg gtg aac gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125
```

```
ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgt caa ggc   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

gac gcc ggc gga cct ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 49
<211> 245
<212> PRT
<213> Homo sapiens

<400> 49

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45
```

```
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
            180                 185                 190

Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

Val Pro Lys Lys Pro
                245
```

<210> 50
<211> 735
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(735)

<400> 50

```
atc gtc ggg ggt cag gag gcc ccc agg agc aag tgg ccc tgg cag gtg   48
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

agc ctg aga gtc cac ggc cca tac tgg atg cac ttc tgc ggg ggc tcc   96
Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

ctc atc cac ccc cag tgg gtg ctg acc gca gcg cac tgc gtg gga ccg   144
Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

gac gtc aag gat ctg gcc gcc ctc agg gtg caa ctg cgg gag cag cac   192
Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

ctc tac tac cag gac cag ctg ctg ccg gtc agc agg atc atc gtg cac   240
Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

cca cag ttc tac acc gcc cag atc gga gcg gac atc gcc ctg ctg gag   288
Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

ctg gag gag ccg gtg aac gtc tcc agc cac gtc cac acg gtc acc ctg   336
Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

ccc cct gcc tca gag acc ttc ccc ccg ggg atg ccg tgc tgg gtc act   384
Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125

ggc tgg ggc gat gtg gac aat gat gag cgc ctc cca ccg cca ttt cct   432
Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
    130                 135                 140

ctg aag cag gtg aag gtc ccc ata atg gaa aac cac att tgt gac gca   480
Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145                 150                 155                 160

aaa tac cac ctt ggc gcc tac acg gga gac gac gtc cgc atc gtc cgt   528
Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
                165                 170                 175

gac gac atg ctg tgt gcc ggg aac acc cgg agg gac tca tgc caa gga   576
Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
```

```
            180                 185                 190

gac gcc ggc gga cca ctg gtg tgc aag gtg aat ggc acc tgg ctg cag   624
Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
        195                 200                 205

gcg ggc gtg gtc agc tgg ggc gag ggc tgt gcc cag ccc aac cgg cct   672
Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
    210                 215                 220

ggc atc tac acc cgt gtc acc tac tac ttg gac tgg atc cac cac tat   720
Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225                 230                 235                 240

gtc ccc aaa aag ccg                                               735
Val Pro Lys Lys Pro
                245
```

<210> 51
<211> 245
<212> PRT
<213> Homo sapiens

<400> 51

```
Ile Val Gly Gly Gln Glu Ala Pro Arg Ser Lys Trp Pro Trp Gln Val
  1               5                  10                  15

Ser Leu Arg Val His Gly Pro Tyr Trp Met His Phe Cys Gly Gly Ser
             20                  25                  30

Leu Ile His Pro Gln Trp Val Leu Thr Ala Ala His Cys Val Gly Pro
         35                  40                  45

Asp Val Lys Asp Leu Ala Ala Leu Arg Val Gln Leu Arg Glu Gln His
     50                  55                  60

Leu Tyr Tyr Gln Asp Gln Leu Leu Pro Val Ser Arg Ile Ile Val His
 65                  70                  75                  80

Pro Gln Phe Tyr Thr Ala Gln Ile Gly Ala Asp Ile Ala Leu Leu Glu
                 85                  90                  95

Leu Glu Glu Pro Val Asn Val Ser Ser His Val His Thr Val Thr Leu
            100                 105                 110

Pro Pro Ala Ser Glu Thr Phe Pro Pro Gly Met Pro Cys Trp Val Thr
        115                 120                 125
```

Gly Trp Gly Asp Val Asp Asn Asp Glu Arg Leu Pro Pro Pro Phe Pro
130 135 140

Leu Lys Gln Val Lys Val Pro Ile Met Glu Asn His Ile Cys Asp Ala
145 150 155 160

Lys Tyr His Leu Gly Ala Tyr Thr Gly Asp Asp Val Arg Ile Val Arg
165 170 175

Asp Asp Met Leu Cys Ala Gly Asn Thr Arg Arg Asp Ser Cys Gln Gly
180 185 190

Asp Ala Gly Gly Pro Leu Val Cys Lys Val Asn Gly Thr Trp Leu Gln
195 200 205

Ala Gly Val Val Ser Trp Gly Glu Gly Cys Ala Gln Pro Asn Arg Pro
210 215 220

Gly Ile Tyr Thr Arg Val Thr Tyr Tyr Leu Asp Trp Ile His His Tyr
225 230 235 240

Val Pro Lys Lys Pro
245